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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/540,513

06/23/2005

Takenori Osada

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EXAMINER

RODELA, EDUARDO A

ART UNIT

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/540,513	<b>Applicant(s)</b> OSADA ET AL.	
	<b>Examiner</b> EDUARDO A. RODELA	<b>Art Unit</b> 2893	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 11 September 2008.
- 2a) ☒ This action is **FINAL**.                      2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1,2,4 and 5 is/are pending in the application.
- 4a) Of the above claim(s) 4 and 5 is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1 and 2 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 23 June 2005 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

This Office Action is in response to the communications received April 9, 2008.

Claims 1 and 2 are under consideration.

#### ***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1 and 2 are rejected under 35 U.S.C. 103(a) as being unpatentable over in Sawada et al. (US 5,751,027) view of Kuroda et al. (US 5,831,296).

Regarding claim 1, Sawada et al. shows (e.g. Figure 1) a compound semiconductor epitaxial substrate for use in a strain channel high electron mobility field effect transistor, comprising:

an InGaAs layer [4] as a strain channel layer; and

an AlGaAs layer [6] containing n-type impurities as an electron supplying layer;

wherein undoped GaAs layers [2,5] having a thickness of 4 nm or more [column 6, lines 56-61] each are laminated respectively in contact [5 is in direct contact with 4, 2 is in contact with 4 by way of 3] with a top surface [shown] and a bottom surface [shown] of said strain channel layer [4];

wherein said undoped GaAs layer [5] is in contact [5 is only in contact with 7 by way of 6] with an undoped AlGaAs layer [7]; and

wherein said AlGaAs layer containing n-type impurities [6] is in contact [direct contact] with said undoped AlGaAs layer [7].

Sawada does not disclose wherein said InGaAs layer has an electron mobility at room temperature of  $8300 \text{ cm}^2 / \text{V}^*\text{s}$  or more. Kuroda shows wherein said InGaAs layer has an electron mobility at room temperature of  $8300 \text{ cm}^2 / \text{V}^*\text{s}$  or more [column 5, lines 5-17]. Kuroda states that  $\text{In}_y\text{Ga}_{1-y}\text{As}$  will have at least a value of between 8500 and 33000, especially if  $y < 0.3$  [column 5: lines 5-17], which Sawada does show [shown in Figure 1]. Therefore it would have been obvious to one of ordinary skill in the art at the time of the invention that the semiconductor layer of Sawada would have the electron mobility specified by Kuroda, as it is known in the art that the specified material could have an electron mobility at room temperature of  $8300 \text{ cm}^2 / \text{V}^*\text{s}$  or more with the required y value.

Regarding claim 2, although not shown by Sawada, it is clearly shown by Kuroda et al. that it is possible and evident that the compound semiconductor epitaxial substrate according to claim 1, as shown in Figure 3a, wherein the InGaAs layer constituting said strain channel layer [24] has an Indium composition of 0.25 or more [column 5, lines 5-17].

One would have been motivated at the time the invention was made to have used wherein the InGaAs layer constituting said strain channel layer has an In composition of 0.25 or more in the invention of Sawada as taught by Kuroda, for the purpose of increasing the electron mobility of the device.

***Response to Arguments***

In regard to the arguments on page 4 and the top of page 5, that Sawada does not show that layer 2 “serves as a buffer layer”, the Applicant’s Representative relies upon evidence of an embodiment (as evidenced by the Representative’s use of element numbers 51 and 52, and the disclosure, “see col. 3, line 63, col. 6, lines 55-64 and Fig. 9”) which is not relied upon by the Examiner to make the rejection. Therefore the evidence provided is not relevant to the current discussion. Next, the claim limitation merely requires that the GaAs layer (2 of Figure 4 of Sawada), “is a spacer layer”. The GaAs layer (2 of Figure 4 of Sawada) clearly meets this limitation, and also, in keeping in line with a broadest reasonable interpretation, a “spacer” layer is interpreted to mean that GaAs layer 2 physically acts as a spacer, thereby defining a particular distance between the substrate 1 and the strain channel layer 21.

It is noted that the arguments include assertions that a “buffer layer” is not shown, but as this language is not present in the claims, this assertion is moot.

In regard to the arguments on page 5, it is clear that Kuroda does teach the electron mobility for the specific material of Sawada, as shown in the rejection, therefore Kuroda does in fact remedy the deficiency by showing the mobility of the exact same material of Sawada.

Applicant's arguments with respect to claims have been considered but are moot in view of the new ground(s) of rejection.

In response to the applicant's arguments on page 6 of the remarks, the arguments against the Kuroda reference individually, one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of

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references. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); *In re Merck & Co.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986).

### ***Conclusion***

The newly added claimed subject matter of, “an undoped AlGaAs layer”, is newly presented subject matter and thus requires the use of Sawada et al. US 5,751,027.

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

### ***Fax / Telephone Information***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to EDUARDO A. RODELA whose telephone number is (571)272-8797. The examiner can normally be reached on M-F, 9:00AM-5:30PM.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Davienne Monbleau can be reached on (571) 272-1945. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

EDUARDO A RODELA /EAR/  
Examiner  
Art Unit 2893

/A. Sefer/  
*Primary Examiner*  
*Art Unit 2893*